This key should allow you to understand why you choose the option you did (beyond just getting a question right or wrong). More instructions on how to use this key can be found here.

If you have a suggestion to make the keys better, please fill out the short survey here.

Note: This key is auto-generated and may contain issues and/or errors. The keys are reviewed after each exam to ensure grading is done accurately. If there are issues (like duplicate options), they are noted in the offline gradebook. The keys are a work-in-progress to give students as many resources to improve as possible.

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1. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-4 - 9x \leq \frac{-51x - 3}{8} < 3 - 7x$$

The solution is $[-1.38, 5.40)$, which is option B.

A. $(-\infty, a] \cup (b, \infty)$, where $a \in [-3.75, -0.75]$ and $b \in [1.5, 7.5]$

$(-\infty, -1.38] \cup (5.40, \infty)$, which corresponds to displaying the and-inequality as an or-inequality.

B. $[a, b)$, where $a \in [-3, -1.2]$ and $b \in [-2.25, 10.5]$

$[-1.38, 5.40)$, which is the correct option.

C. $(a, b]$, where $a \in [-2.25, -0.75]$ and $b \in [3, 11.25]$

$(-1.38, 5.40]$, which corresponds to flipping the inequality.

D. $(-\infty, a) \cup [b, \infty)$, where $a \in [-5.25, -0.75]$ and $b \in [3, 8.25]$

$(-\infty, -1.38) \cup [5.40, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality.

E. None of the above.

General Comment: To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.

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2. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{6}{8} - \frac{5}{9}x \geq \frac{-3}{5}x + \frac{10}{7}$$

The solution is $[15.268, \infty)$, which is option D.

A. $[a, \infty)$, where $a \in [-16.5, -14.25]$

$[-15.268, \infty)$, which corresponds to negating the endpoint of the solution.

B. $(-\infty, a]$, where $a \in [11.25, 15.75]$

$(-\infty, 15.268]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

C. $(-\infty, a]$, where $a \in [-17.25, -13.5]$

$(-\infty, -15.268]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

D. $[a, \infty)$, where $a \in [14.25, 16.5]$

* $[15.268, \infty)$, which is the correct option.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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3. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-7x + 9 \leq 5x + 7$$

The solution is $[0.167, \infty)$, which is option A.

A. $[a, \infty)$, where $a \in [-0.09, 0.29]$

* $[0.167, \infty)$, which is the correct option.

B. $(-\infty, a]$, where $a \in [-0.24, 0.06]$

$(-\infty, -0.167]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

C. $[a, \infty)$, where $a \in [-0.18, 0.1]$

$[-0.167, \infty)$, which corresponds to negating the endpoint of the solution.

D. $(-\infty, a]$, where $a \in [-0.15, 0.75]$

$(-\infty, 0.167]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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4. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-5x - 9 \leq 6x + 5$$

The solution is $[-1.273, \infty)$, which is option C.

A. $[a, \infty)$, where $a \in [0.27, 3.27]$

$[1.273, \infty)$, which corresponds to negating the endpoint of the solution.

B. $(-\infty, a]$, where $a \in [-2.4, -1.1]$

$(-\infty, -1.273]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

C. $[a, \infty)$, where $a \in [-4.27, 0.73]$

* $[-1.273, \infty)$, which is the correct option.

D. $(-\infty, a]$, where $a \in [-1.2, 1.8]$

   $(-\infty, 1.273]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

E. None of the above.

   You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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5. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

Less than 6 units from the number 7.

The solution is $(1, 13)$, which is option B.

A. $(-\infty, 1] \cup [13, \infty)$

   This describes the values no less than 6 from 7

B. $(1, 13)$

   This describes the values less than 6 from 7

C. $[1, 13]$

   This describes the values no more than 6 from 7

D. $(-\infty, 1) \cup (13, \infty)$

   This describes the values more than 6 from 7

E. None of the above

   You likely thought the values in the interval were not correct.

General Comment: When thinking about this language, it helps to draw a number line and try points.

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6. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-3 - 9x \leq \frac{-34x + 9}{4} < 5 - 9x$$

The solution is None of the above., which is option E.

A. $[a, b)$, where $a \in [6.75, 12]$ and $b \in [-6, -2.25]$

   $[10.50, -5.50)$, which is the correct interval but negatives of the actual endpoints.

B. $(-\infty, a] \cup (b, \infty)$, where $a \in [8.25, 15]$ and $b \in [-11.25, -4.5]$

   $(-\infty, 10.50] \cup (-5.50, \infty)$, which corresponds to displaying the and-inequality as an or-inequality and getting negatives of the actual endpoints.

C. $(-\infty, a) \cup [b, \infty)$, where $a \in [3.75, 15.75]$ and $b \in [-6, -2.25]$

   $(-\infty, 10.50) \cup [-5.50, \infty)$, which corresponds to displaying the and-inequality as an or-inequality AND flipping the inequality AND getting negatives of the actual endpoints.

D. $(a, b]$, where $a \in [9, 11.25]$ and $b \in [-6.75, -3]$

$(10.50, -5.50]$, which corresponds to flipping the inequality and getting negatives of the actual endpoints.

E. None of the above.

* This is correct as the answer should be $[-10.50, 5.50)$.

General Comment: To solve, you will need to break up the compound inequality into two inequalities. Be sure to keep track of the inequality! It may be best to draw a number line and graph your solution.

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7. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-5 + 8x > 9x \text{ or } 9 + 8x < 11x$$

The solution is $(-\infty, -5.0)$ or $(3.0, \infty)$, which is option D.

A. $(-\infty, a] \cup [b, \infty)$, where $a \in [-5.47, -4.35]$ and $b \in [1.5, 4.5]$

Corresponds to including the endpoints (when they should be excluded).

B. $(-\infty, a] \cup [b, \infty)$, where $a \in [-4.12, -2.77]$ and $b \in [4.5, 8.25]$

Corresponds to including the endpoints AND negating.

C. $(-\infty, a) \cup (b, \infty)$, where $a \in [-4.5, -2.25]$ and $b \in [4.5, 7.5]$

Corresponds to inverting the inequality and negating the solution.

D. $(-\infty, a) \cup (b, \infty)$, where $a \in [-7.5, -3.75]$ and $b \in [0.75, 3.75]$

* Correct option.

E. $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

General Comment: When multiplying or dividing by a negative, flip the sign.

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8. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$-6 + 8x > 9x \text{ or } 7 + 3x < 5x$$

The solution is $(-\infty, -6.0)$ or $(3.5, \infty)$, which is option B.

A. $(-\infty, a) \cup (b, \infty)$, where $a \in [-5.17, -0.45]$ and $b \in [5.25, 6.75]$

Corresponds to inverting the inequality and negating the solution.

B. $(-\infty, a) \cup (b, \infty)$, where $a \in [-6.52, -4.27]$ and $b \in [1.5, 4.5]$

* Correct option.

C. $(-\infty, a] \cup [b, \infty)$, where $a \in [-7.95, -5.55]$ and $b \in [2.25, 4.5]$

Corresponds to including the endpoints (when they should be excluded).

D. $(-\infty, a] \cup [b, \infty)$, where $a \in [-3.67, -0.3]$ and $b \in [4.5, 9]$

Corresponds to including the endpoints AND negating.

E. $(-\infty, \infty)$

Corresponds to the variable canceling, which does not happen in this instance.

General Comment: When multiplying or dividing by a negative, flip the sign.

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9. Solve the linear inequality below. Then, choose the constant and interval combination that describes the solution set.

$$\frac{-5}{9} - \frac{4}{8}x \leq \frac{8}{7}x + \frac{8}{6}$$

The solution is $[-1.15, \infty)$, which is option B.

A. $[a, \infty)$, where $a \in [1.05, 1.95]$

$[1.15, \infty)$, which corresponds to negating the endpoint of the solution.

B. $[a, \infty)$, where $a \in [-2.4, -0.97]$

* $[-1.15, \infty)$, which is the correct option.

C. $(-\infty, a]$, where $a \in [-2.62, -0.07]$

$(-\infty, -1.15]$, which corresponds to switching the direction of the interval. You likely did this if you did not flip the inequality when dividing by a negative!

D. $(-\infty, a]$, where $a \in [-0.82, 1.27]$

$(-\infty, 1.15]$, which corresponds to switching the direction of the interval AND negating the endpoint. You likely did this if you did not flip the inequality when dividing by a negative as well as not moving values over to a side properly.

E. None of the above.

You may have chosen this if you thought the inequality did not match the ends of the intervals.

General Comment: Remember that less/greater than or equal to includes the endpoint, while less/greater do not. Also, remember that you need to flip the inequality when you multiply or divide by a negative.

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10. Using an interval or intervals, describe all the x-values within or including a distance of the given values.

Less than 8 units from the number -1.

The solution is $(-9, 7)$, which is option C.

A. $(-\infty, -9) \cup (7, \infty)$

This describes the values more than 8 from -1

B. $(-\infty, -9] \cup [7, \infty)$

This describes the values no less than 8 from -1

C. $(-9, 7)$

This describes the values less than 8 from -1

D. $[-9, 7]$

This describes the values no more than 8 from -1

E. None of the above

You likely thought the values in the interval were not correct.

General Comment: When thinking about this language, it helps to draw a number line and try points.